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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/627,418	07/27/2000	Tatsuya Usami	00N010-US	1182
21254	7590	01/26/2006	EXAMINER	
MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC 8321 OLD COURTHOUSE ROAD SUITE 200 VIENNA, VA 22182-3817			QUACH, TUAN N	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/627,418	Applicant(s) USAMI, TATSUYA	
	Examiner Tuan Quach	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2005.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 28-32, 34-58 is/are pending in the application.
- 4a) Of the above claim(s) 52-56 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28-32, 34-51 and 57 is/are allowed.
- 6) ☒ Claim(s) 58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 July 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

  
**Tuan Quach**  
**Primary Examiner**

### DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/27/05 has been entered.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lopatin or Avanzino taken with the admitted prior art and any of Yamazaki, Morisaki, or Nakano.

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Re claim 58, Lopatin (6,096,648) teaches, e.g., column 4 line 60 to column 6 line 61, Figs. 1-8, teaches multilevel interconnection including copper 24 and low dielectric constant layer, e.g., layer 30 including HSQ and FLARE, similar materials employed by applicant, thus possessing the ability that Cu is unlikely to enter, the same material employed consistent with applicant's acknowledgement on page 12 lines 1-2 that it is obvious that HSQ has properties of preventing diffusion of Cu and since Lopatin does not show any diffusion. In any event, the material therein is clearly capable of such characteristics since it is the same or similar material used by applicant.

Avanzino (6,121,150) teaches copper interconnect in multilevel interconnection employing low dielectric organic based such as HSQ, parylene. See column 8 line 45 to column 11 line 27, Figs. 1-3(E). The inherent ability would be obvious for the same reasons delineated.

Although the Office is not equipped to measure the particular copper concentration and Lopatin or Avanzino do not recite the particular Cu concentration regarding  $10^{19}$  atoms/cm<sup>3</sup>, such would be encompassed in therein since Lopatin or Avanzino are not limited or constrained as to the particular concentration. Such would have been further obvious or inherent in these references given they employ the same processing to form the copper, e.g., plating, column 5 line 20 et seq. In Lopatin, column 10 line 56 in Avanzino, see instant specification, page i lines 1-2. Additionally, although the Office is not equipped to measure such concentration, the limitation therein would be inherent and obvious given that the material employed in Lopatin, e.g., HSQ or FLARE, or in Avanzino, delineated above, clearly capable of preventing copper

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diffusion. Regarding the limitations regarding minimum interval between adjacent Cu wiring lines of 0.2 to 0.3  $\mu\text{m}$ , to the extent such is supported by the disclosure, page 9, line 8-9, and page 16 line 16-18, such would have been conventional and obvious as taught by Yamazaki, Nakano, and Morisaki. In particular, Moriasaki, 6,566,756 B1, teaches column 1 lines 59-60 the conventional LSI having desired rule wherein wiring patterns are laid in interval of 0.2  $\mu\text{m}$ ; Nakano, 6,423,651 B1, column 9 lines 21-23 teaches distance between wiring lines of 0.2  $\mu\text{m}$ ; Yamazaki 6,323,142 B1, teaches LSI wiring interval between 0.2 and 0.4  $\mu\text{m}$ . Accordingly, the selection of a distance between wirings to be 0.2 to 0.3  $\mu\text{m}$  or the separation distance approaches a minimum would have been conventional and obvious as corresponding the intervals commonly employed as amply evidenced.

Claims 28-32, 34-51, and 57 are allowed.

As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

Applicant is requested to cancel non-elected claims 52-56 to clear the record regarding the non-elected invention.

Applicant's arguments filed December 27, 2005 have been fully considered but they are not persuasive.

Initially, note that claims 28-32, 34-51 and 57 are allowed in view of the amendment thereof. Insofar as the arguments pertain to the remaining claim 58, contrary to applicant's argument, although the Office is not equipped to measure the

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particular copper concentration and Lopatin or Avanzino do not recite the particular Cu concentration regarding  $10^{19}$  atoms/cm<sup>3</sup>, such would be encompassed in therein since Lopatin or Avanzino are not limited or constrained as to the particular concentration. Such would have been further obvious or inherent in these references given they employ the same processing to form the copper, e.g., plating, column 5 line 20 et seq. In Lopatin, column 10 line 56 in Avanzino. Additionally, although the Office is not equipped to measure such concentration, the limitation therein would be inherent and obvious given that the material employed in Lopatin, e.g., HSQ or FLARE, or in Avanzino, delineated above, clearly capable of preventing copper diffusion. Regarding the separation distance between 0.2 and 0.3  $\mu\text{m}$  is amply taught in the prior art well within the purview of one skilled in the art. In particular, Moriasaki, 6,566,756 B1, teaches column 1 lines 59-60 the conventional LSI having desired rule wherein wiring patterns are laid in interval of 0.2  $\mu\text{m}$ ; Nakano, 6,423,651 B1, column 9 lines 21-23 teaches distance between wiring lines of 0.2  $\mu\text{m}$ ; Yamazaki 6,323,142 B1, teaches LSI wiring interval between 0.2 and 0.4  $\mu\text{m}$ . Accordingly, it remains that the selection of a distance between wirings to be 0.2 to 0.3  $\mu\text{m}$  or the separation distance approaches a minimum would have been conventional and obvious as corresponding the intervals commonly employed as amply evidenced.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tuan Quach whose telephone number is 571-272-1717. The examiner can normally be reached on M-F from 8:30 AM to 4:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Nathan Flynn, can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**Tuan Quach**  
**Primary Examiner**